Form 13F (Mis)Filings

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Abstract

We examine the reliability of Form 13F filings and find significant reporting errors. Using a hand-collected sample of 13F filings by bank holding companies, we show that (1) reported holdings do not always appear on the SEC's Official List, (2) market prices of Official List securities are often inaccurate, and (3) amended 13F reports are sometimes less accurate than the original filings. Overall, our evidence shows that reliance on 13F filings is unwarranted for both private investors and capital markets researchers. One important implication of our findings is that investors using 13F-based (i.e., copycat) trading strategies should exercise extreme caution.

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The roles and influence of institutional investors have changed dramatically over the past several decades. In contrast to individuals, institutional investors have expanded their economic influence from a relatively modest level in 1950 to occupying the commanding heights of US capital markets in 2014. Securities and Exchange (SEC) Commissioner Luis Aguilar notes in a 2013 speech that institutional ownership increased from 7 to 8% of total US market capitalization in 1950 to roughly 67% in 2010. This influence is stronger among leading US companies since institutional ownership is even more concentrated in large, liquid firms. For example, institutions control roughly 73% of the shares of the largest 1,000 publicly-traded companies.[1] At the conclusion of his speech, Commissioner Aguilar sums up the impact of institutional investors by stating that, "Clearly, institutional investors have a great deal of power in our capital markets." This power has attracted considerable attention among academic researchers, investors (both individuals and institutions), and government regulators. While academic researchers are interested in understanding the causes and consequences of institutional ownership, investors are interested in tracking and replicating the trading strategies of successful institutional investors. The focus of government regulators, like Commissioner Aguilar, is to monitor and provide oversight of institutional investors. The effectiveness of these three actors, among others, depends crucially on their ability to access timely and accurate information about institutional investor holdings. The primary purpose of this study is to evaluate the quality of such information.

Form 13F is the most fundamental and comprehensive source of institutional investor information. As described in Section 13(f) of the Securities Act Amendments of 1975 (pertaining to the Securities Exchange Act of 1934), institutional investors who exercise investment discretion

[1] The full text and accompanying references for this speech, "Institutional Investors: Power and Responsibility," can be found at http://www.sec.gov/News/Speech/Detail/Speech/1365171515808#.VA9hNBB0arA. The speech was delivered on April 19, 2013 at Georgia State University.

on portfolios of over $100 million of Section 13(f) securities must disclose such holdings within 45 days of the end of each calendar quarter. The SEC updates and publishes a list of Section 13(f) securities (i.e., the Official List) on a quarterly basis. Section 13(f) securities consist of mostly publicly-traded equities, along with specific equity options, warrants, and convertible bonds. The 13F disclosure requirements appear to be both straightforward to interpret and simple to implement; first, institutional investors match their holdings against the SEC's Official List;[2] second, institutional investors disclose the CUSIP number, number of shares, and the total market value of their holdings for matched securities as of the last business day of the quarter.[3] These CUSIPs, shares, and market values provide the raw material for researchers, investors, and regulators to construct databases from which to analyze institutional investor behavior. We examine the accuracy of this raw material.

Although there are many users of 13F reports, private investors represent an especially important group since their decisions directly impact market prices and capital formation. In addition, the SEC designed its 13F disclosure requirements largely from the perspective of the investing public since its primary mission is to protect investors.[4] Relying on this protection, many investors use 13F filings to construct copycat trading strategies. One representative example (among many) of this investment strategy is described by David Larrabee in a November 2014 blog as follows:

[2] Although it is straightforward to compare one's holdings against the SEC's Official List, it is not straightforward (or clear) how that SEC determines the contents of this list. The list does not include all publicly-traded securities, and does include some non-publicly-traded securities. The SEC does not publish its selection criteria for determining which securities will be added or deleted from the Official List, and the composition of reportable and non-reportable securities nevertheless reveals considerable variation through time.

[3] Recent studies show that institutional investors, particularly hedge funds, can avoid or delay such straightforward, direct disclosures by requesting a confidentiality period from the SEC (Aragon, Hertzel, and Shi (2013), Agarwal, Jiang, Tang, and Yang (2013)).

[4] The SEC website states that, "The mission of the U.S. Securities and Exchange Commission is to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation."

> While quarterly 13F filings are dated and don't necessarily present a full picture of a manager's holdings – they don't include short positions – seeing them is a bit like getting a peek at the other team's playbook.

There are many websites that track changes in "the other team's playbook" and then make stock-picking recommendations. One such website (SeekingAlpha.com) focuses on 13F-reported changes in George Soros' investment portfolio. Its update on May 19, 2016 (using Soros' May 16, 2016 13F filing) emphasizes that "a large new position in Barrick Gold was established during the quarter," and an earlier position in Dow Chemical had been eliminated. Another website (WhaleWisdom.com) uses 13F filing data from hedge funds to help investors determine "good candidates for copying" and provides additional data on stocks that hedge funds are "starting to show an interest in." A related article posted on an investor-focused website (Realmoney.thestreet.com) claims that 13Fs are "the world's best free research service" (Melvin 2016a). These stories highlight the widespread use of 13F filings to construct copycat trading strategies. Our study examines the margin of error that is inherent to such strategies.

One indication that 13F filings have serious flaws comes from a second group of (disgruntled) investors who have tried to track changes in institutional holdings. Disclosure accuracy is particularly important for such investors as they attempt to replicate (and then profit from) successful trading strategies. There is anecdotal evidence from various investor blogs complaining that inaccuracies are sufficiently serious to render 13F filings useless for tracking (and therefore replicating) purposes. One such investor blog entitled "Rant time" is fairly typical. In his March 13, 2014 blog Dave Manuel (www.davemanual.com) asks "How does the SEC not have a program in place to adequately deal with Form 13F filings?" and then continues as follows:

> As it stands right now, the Form 13F filings are just a non-standardized mishmash of jumbled (and often inaccurate) information. Seriously – have fun going through these filings if you are doing any type of serious research. I guarantee you that you

> will have a migraine headache when you are done. In addition, you will very likely notice glaring errors staring back at you from the pages of the reports.

Are these assertions the rants of a disgruntled investor unable to earn trading profits by monitoring quarterly changes in institutional holdings, or are 13F filings filled with "glaring errors" and seriously "inaccurate information?"

In addition to investor complaints, a second (and perhaps more credible) indication that 13F filings could have serious flaws comes directly from the SEC itself. In 2010, the SEC's Office of Inspector General (OIG) issued a 46-page report entitled Review of the SEC's Section 13(f) Reporting Requirements. The OIG investigation uncovered multiple problems that cast serious doubts on the reliability of 13F filings. Among the relevant findings, the OIG review concluded that: (1) "no SEC division or office has been delegated authority to review and analyze the 13F reports, and no division or office considers this task as falling under its official responsibility;" (2) "no SEC division or office monitors the Form 13F filings for accuracy and completeness," and (3) "there are no checks built into the EDGAR system, through which the Forms 13F are filed …" The OIG report concludes that "despite Congressional intent that the SEC would be expected to make extensive use of the Section 13(f) information for regulatory and oversight purposes, no SEC division or office conducts regular or systematic review of the data filed on Form 13F."[5]

Echoing the same shortcomings identified in the 2010 report, a recent Wall Street Journal article (2014) reports that SEC Chairperson Mary Jo White has "asked staff to develop an action plan to enhance the SEC's oversight of asset managers. The plan would include 'more robust data reporting' and increased oversight of the largest firms …"[6] Although the OIG report was published in 2010, there is no evidence of significant improvements in the accuracy or usefulness of Form

[5] EDGAR is an acronym that refers to the SEC's **E**lectronic **D**ata **G**athering, **A**nalysis, and **R**etrieval system.
[6] This article appeared in the Wall Street Journal on September 7, 2014 under the title, "SEC Preps Mutual Fund Rules." It can be found at http://online.wsj.com/articles/sec-preps-mutual-fund-rules-1410137113.

13F filings. In fact, the SEC has recently added the following new caveat to all 13F documents (from 2013 to present):

> The Securities and Exchange Commission has not necessarily reviewed the information in this filing and has not determined if it is accurate and complete. The reader should not assume that information is accurate and complete.

It is a rather disturbing statement that users of 13F filings "should not assume that information is accurate and complete." In our study, we attempt to quantify the degree to which users can or cannot assume that such information is accurate and complete. We focus on the largest reporting firms since, according to Chairperson White's instructions, these firms should have the most "robust data reporting and oversight."

Unlike the concerns expressed by investors and regulators, academic researchers to date have not raised alarms about the underlying accuracy of 13F filings. To the extent that previous research has been critical of 13F filings, such studies tend to focus on potential shortcomings in reporting rules and procedures. For example, Blume and Keim (2012) point out that the $100 million reporting threshold has not changed over the past several decades while stock market capitalization has increased significantly over the same time period. The secular growth in market capitalization means that relatively smaller institutions have become subject to Form 13F reporting requirements over time. They also point out that the borrowing and lending of securities among institutions can result in double counting. For example, if institution A lends 100 shares of security XYZ to institution B for the purpose of short selling security XYZ, the SEC's reporting requirements can cause both institutions A and B to report holdings of 100 shares of security XYZ. Other studies (e.g., Aragon, Hertzel, and Shi (2013), Agarwal, Jiang, Tang, and Yang (2013)) show that hedge funds are able to temporarily hide certain holdings from 13F filings through

confidentiality appeals to the SEC. Since these appeals lead to delayed disclosures, institutional ownership data might not capture all of an institution's holdings on a timely basis.

In contrast to complications caused by reporting thresholds, double counting, and temporary confidentiality exemptions, our study focuses directly on the reliability of Form 13F information. Serious reporting inaccuracies in market value and ownership interest could call into question previous research findings based on 13F filings. It is difficult to estimate how many research papers have used 13F filings to determine institutional ownership. A search of the Social Science Research Network (SSRN) using "institutional investors" as a keyword search yields 3,286 papers. Although not all 3,286 papers attempt to quantify institutional holdings and therefore rely on 13F filings, a significant percentage of the papers published in high-quality journals do take this quantitative approach. Most academic studies rely on 13F filings compiled quarterly by a third-party vendor, Thomson/CDA, and then accessed through Wharton Research Data Services (WRDS). Researchers have little reason to challenge the accuracy of such information since it is built on "official" SEC data that are then collected, organized, and displayed by a reputable third-party data provider.

We examine the accuracy of 13F filings using all reported securities of the largest 15 holding companies as defined by the National Information Center.[7] We focus on this subsample of firms for two main reasons. First, our database is hand collected from EDGAR and the full sample of reporting institutions (and their holdings) is too large for detailed collection and analysis. Second, we select a subsample that is (on an ex ante basis) more likely to bias against findings of significant disclosure inaccuracies than a subsample of small funds. Such large, high-profile

[7] The largest 15 holding companies during our sample period include: JPMorgan Chase, Bank of America, Citigroup, Wells Fargo, Goldman Sachs, Morgan Stanley, AIG, General Electric Capital, Bank of New York Mellon, US Bancorp, HSBC, PNC Financial, Capital One Financial, TD Bank, and State Street.

companies are under a high level of scrutiny by regulators, investors, and the financial media. This line or reasoning is also consistent with SEC Chairperson White's instructions (above) to focus on the accuracy of large firms.

Our empirical findings are consistent with investor complaints; specifically, we find systematically "glaring errors" and a "non-standardized mishmash of jumbled (and often inaccurate) information." In the Appendix, we provide a sample of data from a 13F report filed by the US Bancorp (4th quarter of 2012) to show the type of information available to investors directly through EDGAR. According to SEC requirements, reporting firms must provide the total market value and the total number of shares held at the end of each quarter. To check 13F-reported values against independent sources, one must assume that either (1) the number-of-shares figure is correct, and so any discrepancies are due to price inaccuracies, or (2) the price per share is correct, and so any discrepancies are due to number-of-share inaccuracies. Taking US Bancorp's first listed holding of Visteon Corp as an example, if we assume that the reported number-of-shares figure (i.e., 10) is correct, then the implied 13F-reported closing price per share would be $100 (i.e., $1000/10) on the last trading day of the quarter. In contrast, the actual closing price on the last trading day of the quarter is $53.82 – a difference of $46.18 per share. Instead, if we assume that the implied 13F-reported price is correct (i.e., $53.82), then the number of shares would be 18.58 (i.e., $1000/$53.82) – a difference of 8.58 shares. Although we cannot isolate the source of this reporting inaccuracy (i.e., price, number of shares, or some combination of both), we can certainly document that the numbers do not add up. In this study, we perform similar checks on a larger scale and find systematic errors in 13F reporting. Many of these errors are economically significant in terms of their individual and aggregate magnitudes.

Our empirical analyses include several important findings. First, we show that the overall frequency of incorrect pricing in 13F reports exceeds the overall frequency of correct pricing. We also find substantial variation across individual reporting firms. For example, Citigroup has 7,170 (7,970) cases of 13F-reported overpricing (underpricing), compared to only 3,570 cases of 13F-reported correct pricing. At the other end of the spectrum, AIG has only 470 (388) cases of 13F-reported overpricing (underpricing) against 7,390 cases of correct pricing. Second, we find that the magnitudes of these mispricings are economically significant. Since all reporting firms are required to record their security prices on last day of the quarter, these prices should be the same across all reporting firms for the same security. Applying this regulatory requirement to equities, for example, we find that 13F-reported prices for the same security deviate by $16.46 on average between the maximum and minimum 13F-reported prices.[8] That is, for a given security, we obtain 13F-reported prices across our sample reporting firms, calculate the dollar difference between the highest and lowest reported price, and then average these differences across all securities.

Third, we calculate percentage deviations for each 13F-reported security based on the minimum (maximum) price reported among our sample firms. To obtain average deviations based on minimum (maximum) 13F-reported prices, we calculate the following percentage for each security: [minimum (maximum) 13F-reported price – market price] / [market price]. We then average these percentages across all securities. We find that the average percentage deviation is -50.41% (12.86%) for equities based on minimum (maximum) 13F-reported prices. In addition to these aggregate figures, we also perform the same analysis on a firm-by-firm basis and, as expected, find substantial variation across individual reporting firms. Fourth, we investigate the accuracy of amended 13F filings and find that they do not appear to rectify the initial inaccuracies.

[8] In addition to equities, we also examine 13F-reported price inaccuracies for fixed income and other securities.

The extensive use of amended filings (whether because of intentional deception or unintentional errors) not only makes it difficult for investors to have confidence in the initial filings, but also raises concerns about the accuracy of the amended filings.

Fifth, we show that if one assumes that prices per share are accurate in the 13F filings (i.e., instead of assuming the number-of-share accuracy), then the number-of-share figures would substantially distort the ownership interest percentages. For example, we find 21 cases in which aggregate ownership for a limited sample of just 12 reporting firms would exceed 100% of the shares outstanding of the underlying security. In one extreme case, these 12 reporting firms would have combined ownership interest of 2,648,923 shares for a firm with only 100,000 shares outstanding. Finally, we compare institutional holdings of Dow 30 firms based on institutions' 13F filings versus the underlying firms' DEF14A filings (i.e., annual proxy statements).[9] We find significant differences in the level of institutional ownership reported by the owning institutions in their 13F filings versus the level of ownership reported by the underlying (owned) firms in their DEF14A filings. Overall, our findings show that any reliance on 13F-reported figures is fraught with problems.

The primary contribution of our study is to document the lack of reliable information gathered, maintained, and distributed by the SEC on the very institutions that "have a great deal of power in our capital markets." It is far too easy for investors and researchers to be lulled into a false sense of security with respect to data integrity by relying on reputable, third-party data providers when obtaining institutional holdings' figures. Our study suggests that the SEC's methods of data collection and monitoring would require significant improvements before such reliance is warranted.

[9] Ownership data in the DEF14a are from Schedule 13G, as filed by the owning institution.

Related research

In this section, we provide a brief summary of related research that examines the relation between Form 13F filings and institutional investors. Much of this research focuses on hedge funds since private investors are particularly interested in monitoring and replicating hedge fund trading strategies – and Form 13F is the only public vehicle through which such tracking can take place. Brown and Schwarz (2013) find evidence of abnormal stock market returns and trading volumes immediately after 13F filings become public. Their findings suggest that, while investors try to take advantage of hedge fund disclosures, investors are unlikely to benefit from such trading strategies. These results and conclusions are consistent with two stylized facts that we discussed above. First, hedge funds make extensive use of confidentiality requests to the SEC to try to conceal their actual positions. These requests and their delayed (i.e., amended) filings significantly reduce the usefulness of 13F filings to outside investors attempting to track and replicate successful hedge fund managers. Second, these results are also consistent with private investor complaints that 13F filings are so wrought with errors as to render them useless.

Two related papers by Aragon, Hertzel, and Shi (2013) and Agarwal, Jiang, Tang, and Yang (2013) also show that hedge fund managers use confidentiality appeals to protect what they view as proprietary information on holdings. Aragon, Hertzel, and Shi (2013) find that hedge fund returns are abnormally positive for the same positions that they seek to hide from the public. This result suggests that hedge fund managers can distinguish between their truly valuable (i.e., private) information and other less-valuable information. They request confidentiality for the former and report the latter at the end of the quarter as part of the normal 13F process. These authors also find that hedge fund managers are particularly interested in hiding (through SEC confidentiality

appeals) their holdings of illiquid positions. Similarly, Agarwal, Jiang, Tang, and Yang (2013) use these hidden or "confidential" holdings to examine the investing skill of hedge fund managers. They find that hedge funds' confidential holdings are associated with superior return performance for up to one year. Overall, these studies suggest that (1) a subset of institutional investors possess valuable private information, (2) the managers of these institutions have a strong incentive to avoid timely disclosure of their holding through Form 13F filings, and (3) they successfully use confidentiality appeals for the purpose of hiding their holdings.

A second line of research relies on institutional data from 13F filings to make inferences about the roles or consequences of institutional investors. We focus on a small sample of these studies since a full review would be too voluminous to summarize herein. Blume and Keim (2012) examine the relation between institutional ownership (based on 13F filings) and stock market liquidity. They find that institutions in general and hedge funds in particular are moving away from larger, more liquid firms and towards smaller, less liquid firms. When they contrast institutional percentage ownership with the number of institutions that own a given stock, they show that the number of institutional owners has greater explanatory power in terms of cross-sectional variation in firm liquidity. Blume and Keim (2014) also find that institutional ownership has changed dramatically over the past 30 years. Beginning in 1990, institutions begin to underweight large stocks (relative to their market values) and overweight small stocks. It is important to note, however, that these empirical findings are all based on an underlying assumption of 13F accuracy.

Agarwal, Fos, and Jiang (2013) take this dependency on 13F filings one step further. They are interested in ascertaining the extent and patterns of self-reporting biases that are inherent in the construction of hedge fund databases. They construct a large database of hedge fund performance

by combining five of the largest commercially-available databases of self-reported hedge funds. They find that hedge funds tend to initiate self-reporting after periods of positive performance, and to terminate self-reporting prior to periods of weak performance or large cash withdrawals. While this is a very clever method to capture self-reporting biases, the results are completely dependent on the accuracy of 13F filings since Form 13F is used as the (unbiased) benchmark against which they measure self-reporting biases. Overall, our brief summary of the related literature shows that much of what we know about the role, influence, and consequences of institutional investors is contingent on data obtained from 13F filings.

Reporting requirements

In addition to Form 13F, the Securities Exchange Act of 1934 and its amendments cover the following mandatory disclosures based on ownership or holdings: Schedule 13D, Schedule 13G, Section 16, Forms N-CSR and N-Q. Schedule 13D requires disclosure by active shareholders with ownership interests that exceed 5%, while Schedule 13G requires disclosure for large passive shareholders. Section 16 requires disclosure by insiders, while Forms N-CSR and N-Q require disclosures of mutual funds' quarterly and semi-annual holdings. But among all the mandatory disclosures based on ownership, Form 13F is the most comprehensive since it is not restricted to 5% ownership thresholds, passive ownership, insiders, or mutual funds.

Two of the most important aspects of Form 13F filings include: (1) which entities are required to file, and (2) what information must be filed by these reporting entities. The SEC specifies that "An institutional investment manager that uses the U.S. mail (or other means or instrumentality of interstate commerce) in the course of its business, and exercises investment discretion over $100 million or more in Section 13(f) securities (explained below) must report its

holdings on Form 13F with the Securities and Exchange Commission (SEC)."[10] Next, the SEC defines an institutional investment manager as "(1) an entity that invests in, or buys and sells, securities for its own account; or (2) a natural person or an entity that exercises investment discretion over the account of any natural person or entity. Institutional investment managers can include investment advisers, banks, insurance companies, broker-dealers, pension funds, and corporations." The SEC's definition of an institutional investment manager is quite broad and clearly intended to capture a wide range of entities.

After specifying the "who" of required disclosures, the SEC then articulates the "when and what" of required disclosures as follows:

> Form 13F is required to be filed within 45 days of the end of a calendar quarter. The Form 13F report requires disclosure of the name of the institutional investment manager that files the report, and, with respect to each section 13(f) security over which it exercises investment discretion, the name and class, the CUSIP number, the number of shares as of the end of the calendar quarter for which the report is filed, and the total market value.

The total market value is reported as of the last day of the quarter. Finally, the SEC specifies that types of securities that fall under Section 13(f) reporting as follows:

> Section 13(f) securities generally include equity securities that trade on an exchange (including the Nasdaq National Market System), certain equity options and warrants, shares of closed-end investment companies, and certain convertible debt securities. The shares of open-end investment companies (i.e., mutual funds) are not Section 13(f) securities. Section 13(f) securities can be found on the Official List of Section 13(f) Securities. The Official List is published quarterly and is available for free on the SEC's website.

Using these SEC statements as a guideline, it seems to be a rather straightforward matter to determine who should report, what they should report, and when they should report. The reporting institution simply matches its portfolio holdings against the Official List and then reports

[10] All SEC quotes used in this section can be found at http://www.sec.gov/answers/form13f.htm.

the security's name, CUSIP number, number of shares, and total market value as of the end of the calendar quarter. In the next section, however, we show that for whatever reason(s) such a straightforward implementation is not the reporting norm among institutional investors.

Empirical results

Overview. As mentioned above, the SEC publishes a list of required securities for 13F filings (i.e., the Official List). In **Table 1** we summarize the 13F reporting requirements by number and type of security for the period from the 1st quarter of 2008 through the 4th quarter of 2012. The types of securities include stocks, options, ETFs, warrants, and debt instruments as well as less-commonly traded instruments. The number of required securities to be reported ranges from a low of 14,464 (3rd quarter of 2009) to a high of 15,201 (4th quarter of 2012). Stocks represent about one third of these required securities. It is important to note that the SEC does not publish its criteria for inclusion onto, or exclusion from, the Official List. That is, required securities are added and deleted each quarter without explanation. In addition, the Official List includes hundreds of securities each quarter, from a low of 306 to a high of 518, which are included multiple times on the official list. The Official List also includes hundreds of securities each quarter, from a low of 316 to a high of 473, that represent securities deleted (without explanation) from SEC filing requirements.

We divide all required securities from the Official List into three mutually-exclusive categories: CRSP securities, TRACE securities, and OTHER securities. CRSP securities include stocks, units, funds, and ADRs that can be matched to data found on CRSP. TRACE securities include fixed-income instruments, and OTHER securities include options, warrants, and rights.

Unlike with the CRSP and TRACE securities, we are unable to independently verify market values for the OTHER securities.

In our empirical analyses, we focus on the Official List list of required securities from the 4th quarter of 2012. Of the 15,201 total SEC required securities, 6,609 (43.5%) securities are also available on CRSP, while 285 (1.9%) ADRs, ETFs/Funds, stocks, and units are not available on CRSP. SEC's Official List also includes two securities which, according to CRSP, do not start trading until 2013, 29 securities which had ceased trading prior to the 4th quarter of 2012, and one security which had not traded on an exchange since 2003. Of the remaining 8,592 (56.5%) securities, 372 (2.5%) securities are available on TRACE. Our OTHER category includes 8,220 (54.1%) securities (e.g., ADRs, options, debt instruments, preferred stocks, and other securities) which are not available on CRSP or TRACE. These figures mean that we are able to check the end-of-quarter market prices of roughly 46% (43.5% + 2.5%) of the securities on the SEC's Official List against their 13F-reported prices.

Security price (in)accuracies. For reasons stated above, we focus our analyses on the largest 15 Holding Companies as reported by the National Information Center. In **Table 2** we present a summary of the 13F filings for the 4th quarter of 2012 for each of these 15 firms.[11] The primary information provided by firms includes the name of the issuing firm, the CUSIP number, the total market value of the holdings, and the number of the securities held. The results show considerably higher variability in the number of 13F entries than expected.[12] Three of the 15 firms (General Electric Capital, Capital One Financial, and TD Bank) do not report any information on Form 13Fs. How likely is it that these three firms hold none of the securities which appear on the

[11] We conduct parallel analyses for the first three quarters of 2012. The results are very similar to those reported herein.
[12] An entry consists of a CUSIP number, total market value, and number of shares held. Since firms can report the same security in different tranches, an investment in a single firm may be represented by multiple entries.

SEC's Official List? Unfortunately, researchers are unable to distinguish among firms that fail to report required securities, firms that will report required securities in an amended (subsequent) filing, and firms that simply hold no required securities. Of the remaining 12 firms, the number of entries ranges from a low of 3,602 for State Street to a high of 29,325 for Morgan Stanley.

In addition, we find that three firms report securities that do not appear on the SEC's Official List. JPMorgan reports 670 such securities, while AIG and State Street report five and six unofficial securities, respectively. If firms report securities which do not appear on the Official List, how likely is it that they fail to report securities which do appear on the Official List? Unfortunately, researchers have no way to know with certainty. We also show that only two of the 12 firms (Citigroup and HSBC Holdings) correctly label all reported security types in their 13F entries. An example of mislabeling is when a reporting firm identifies an equity security as a debt security. Mislabeling appears to be a serious problem for six of the 12 reporting firms with over 1000 examples of each, ranging from a minimum of 1,097 examples for U.S. Bancorp to a maximum of 4,691 examples for Morgan Stanley.

Table 2 also provides a breakdown of the types of securities reported in 13F filings. Most of the securities for each of the 12 firms are CRSP securities, while the mix between TRACE and OTHER securities varies from firm to firm. In the last three columns of **Table 2**, we present the firm's (1) total 13F-reported value of required securities (as recorded at the top of the 13F filing), (2) aggregate 13-F-reported value of required securities (as summed up within the 13F filing), and (3) total market value of required securities (as per CRSP and TRACE).[13, 14] To make this last

[13] This approach biases against finding price discrepancies since we must take the prices from the OTHER category as given (i.e., assume 100% accuracy on the part of the reporting firm). This constraint means that all such price discrepancies are restricted to publically-traded (and verifiable) CRSP- and TRACE-related securities, while one would expect greater price discrepancies among the non-public, thinly-traded OTHER securities.

[14] CRSP security prices are compared to the closing price reported by CRSP for the last day of the quarter. TRACE securities are not always traded on a daily basis. We therefore use the price from the last day of the quarter when available; when not available, we use the price from the last day the debt instrument traded during the quarter.

calculation, we must first assume that the firm accurately reports the number of shares that it holds. We will show in subsequent sections that even this assumption (while necessary) is often unwarranted. After making these calculations, the values in these last three columns should be identical for each reporting firm. Comparing the total 13F-reported values to the total market values, we find value discrepancies ranging from $72,430 for JPMorgan to $3,481,217,490 for Wells Fargo, with several other firms having value discrepancies in the millions of dollars. These figures are likely to understate the true level of value discrepancies since, as mentioned above, our estimates are based on the assumption that all OTHER securities have zero price inaccuracies. The aggregate figures are also likely to understate price discrepancies at the disaggregated individual security level, a topic we examine in **Tables 3** and **4**.

Frequency of mispricing. In **Table 3** we report the number of equity-related security entries by reporting firm and the number of such entries with corresponding CRSP prices. The discrepancy between these two numbers means that a reporting firm is posting a publicly-traded equity security in its 13F filing that we are unable to locate in the CRSP database. Next, we present comparisons of 13F-reported individual security prices (i.e., 13F-reported market value divided by 13F-reported number of securities held) to corresponding market prices based on CRSP. We then present the number of instances in which the market price (i.e., CRSP-based) is (1) less than the 13F-reported security price, (2) equal to the 13F-reported security price, and (3) greater than the 13F-reported security price. The results show considerable variation in the degree of accuracy among the 12 reporting firms, but no firm is immune to overpricing and underpricing. Citigroup is particularly susceptible to mispricings with 7,170 (7,970) cases of 13F-reported overpricing (underpricing), compared to only 3,570 cases of 13F-reported accurate pricing. In contrast, AIG

has only 470 (388) cases of 13F-reported overpricing (underpricing) against its 7,390 cases of accurate pricing.

In **Table 4** we report the number of debt-related security entries by reporting firm and the number of such entries with corresponding TRACE prices. Again, the discrepancy between these two numbers means that we are unable to locate a debt security (reported by the firm) in the TRACE database. Parallel to **Table 3**, we then present comparisons of 13F-reported individual security prices to corresponding market prices based on TRACE. Finally, we calculate the number of instances in which the market price (i.e., TRACE-based) is (1) less than the 13F-reported security price, (2) equal to the 13F-reported security price, or (3) greater than the 13F-reported security price. As with the equity-related results in **Table 3**, our debt-related findings reveal considerable variation across the 12 reporting firms. Among PNC Financial's 33 securities, 19 are overpriced in the 13F report, 14 are underpriced in the 13F report, and none is correctly priced in the 13F report. We find similar results for AIG's 13 securities; 8 are overpriced, 5 are underpriced, and none is correctly priced. A more typical case, however, is Morgan Stanley with 132 overpriced securities, 70 underpriced securities, and 105 correctly priced securities.

Overall, **Tables 3** and **4** demonstrate that a significant percentage of the securities that fall under the SEC's required reporting list (i.e., Official List) are inaccurately priced. This finding is particularly surprising in the case of publically-traded securities since SEC instructions are straightforward; specifically, for each security, multiply the number of shares held on the last day of the quarter times its closing price on the last day of the quarter. If mispricing is this common for publically-traded CRSP and TRACE securities, one can only wonder how common it is for OTHER securities. In our next section, we move from the frequencies of mispricing to the dollar magnitudes of mispricing.

Magnitude of mispricing. We explore the magnitudes and sources of 13F reporting inaccuracies in greater detail in **Tables 5** through **8**. Since all reporting firms are required to record their security prices on the same business day (i.e., last day of the quarter), these prices should be the same across all reporting firms holding the same security (i.e., same CUSIP). Using this regulatory requirement, we examine the 13F reports across all 12 reporting firms in the 4th quarter of 2012 to compare 13F-reported prices for the same security. Our findings are summarized in **Table 5**. The total number of required (reportable) securities is roughly 7,459, with 6,505 CRSP-related securities, 349 TRACE-related securities, and 605 securities in our OTHER category.

On average, each CRSP security is reported 26 times in 13F filings, each TRACE security is reported six times, and each OTHER security is reported three times across the 12 reporting firms. In spite of the SEC's clear pricing instructions, we find that 13F-reported prices for the same CRSP securities deviate by $16.46 on average; that is, for a given security, we obtain 13F-reported prices across our 12 reporting firms, calculate the dollar difference between the highest and lowest reported price, and then average these differences across all securities. Following this same procedure for TRACE and OTHER securities, we find that 13F-reported prices for TRACE securities deviate by $0.079[15] on average, and by $4.84 for OTHER securities. As with our earlier price-related findings, these results are based on the questionable, but necessary, assumption that there are no inaccuracies in the firm's 13F-reported number of securities held. That said, it is interesting to note that while CRSP and OTHER securities show considerable inaccuracies in the magnitude of mispricing, TRACE securities appear to have very little mispricing.

We also examine the 13F-reported price discrepancies that can be verified using CRSP and TRACE data. For CRSP securities, the average deviation increases slightly to $16.55 while for

[15] TRACE prices are based on $1,000,000 face value bonds.

TRACE securities, the average deviation decreases slightly to $0.069. In contrast, when security prices cannot be verified using publicly-available data, CRSP securities' average deviation decreases to $11.56, while TRACE securities' average deviation increases substantially to $0.456.

Next, we calculate percentage deviations for each 13F-reported security based on the minimum (maximum) price reported among the 12 firms. For average deviations based on minimum 13F-reported prices, we calculate the following percentage for each CRSP/TRACE-related security: (minimum 13F-reported price – market price)/(market price). We then average these percentages across all CRSP/TRACE-related securities. Market prices are based on CRSP or TRACE, depending on the underlying security. We perform the same calculations after substituting the maximum 13F-reported price (in place of the minimum 13F-reported price) into the percentage formula. The results of this analysis provide a picture of extreme cases and allow us to better understand just how inaccurate prices could be when relying on 13F filings.

We find that the average percentage deviation is -50.41% for CRSP securities and -2.80% for TRACE securities, based on minimum 13F-reported prices. The most negative percentage deviation is -100% for both the CRSP and TRACE securities, while the most positive percentage deviation is 92.02% for CRSP securities and 42.86% for TRACE securities. Turning to the maximum 13F-reported prices, we find that the average percentage deviation is 12.86% for CRSP securities and 3.12% for TRACE securities, based on minimum 13F-reported prices. The most negative percentage deviation is -100% for CRSP securities, but only -5.91% for TRACE securities. Finally, the most positive percentage deviation is 1,013.80% for CRSP securities and 75.41% for TRACE securities. Overall, these results confirm earlier evidence suggesting that reliance on 13F-reported prices is unwarranted.

Mispricing by reporting firm. In this section, we examine mispricing in greater detail at the reporting-firm level. Specifically, for each reporting firm, we present the number of times that it reports the minimum (or maximum) security price among all 12 reporting firms. We also present for the minimum and maximum price cases, the reporting firm's average, minimum, and maximum percentage deviations from market prices. **Table 6** provides these figures for CRSP firms, while **Tables 7** and **8** provide the same figures for TRACE and OTHER firms, respectively.

In **Table 6**, focusing first on the minimum 13F-reported prices, we find considerable variation across the 12 reporting firms. While State Street is responsible for only 16 cases of reporting the minimum price across all reporting firms for the same security, Citigroup is responsible for 1,784 cases. The average percentage deviation figures tell a similar story of wide variation among reporting firms. AIG's average percentage deviation is -0.22%, while the Bank of New York's average percentage deviation is -77.65%. The most negative percentage deviation is -100% for eight of the 12 firms, and the most positive percentage deviation is 25.45% for Citigroup. Turning to the maximum 13F-reported prices, we again find considerable variation across the reporting firms. While HSBC is responsible for only 14 cases of reporting the maximum price, Citigroup is responsible for 1,358 cases. State Street has the highest average percentage deviation at 27.06% of market (i.e., CRSP, TRACE) prices, and HSBC has the lowest at 1.22%. The most negative percentage deviation is -100% for three of the 12 firms, and the most positive percentage deviation is 1,013.80% for State Street.

We present similar figures in **Table 7** for TRACE securities. Focusing first on the minimum 13F-reported prices, we observe that AIG is responsible for only two cases, Wells Fargo is responsible for 90 cases. Similarly, the average percentage deviation figures range from AIG's 0.45% to Wells Fargo's -5.03%. Although the average figures are mild relative to their CRSP

counterparts in **Table 6**, the maximum and minimum percentage deviations still show considerable variation. Three firms have minimum percentage deviations of -100% and one firm (Morgan Stanley) has a maximum percentage deviation of 51.44%. We find even more pricing variation for the maximum 13F-reported prices. Three firms have only one case of reporting the maximum 13-F reported price, while Morgan Stanley is responsible for 63 cases. The average percentage deviation figures range from AIG's 0.25% to Bank of America's 728%. The maximum and minimum percentage deviations reveal similar variation to their minimum percentage deviation counterparts.

In **Table 8** we summarize how often each firm reports the minimum and maximum 13F-reported price for OTHER securities. Without publically-available market prices, we are unable to calculate comparable percentage deviation figures as in **Table 6** and **7** for CRSP and TRACE securities, respectively. As shown in the **Table 8**, JPMorgan has by far the most cases of both minimum and maximum 13F-reported prices at 187 each. This finding is perhaps not so surprising since JPMorgan's 13F reports include 84% of the total number of OTHER securities.

Overall, our firm-level mispricing results in **Tables 6**, **7**, and **8** show that researchers, investors, and regulators have good reason to doubt the accuracy of 13F-reported security prices. The results also show that such mispricing is widespread among all 12 reporting firms, and not limited to a small group of particularly inaccurate report providers.

(Mis)Filing amended reports. As with other SEC filings, reporting firms are permitted to file amendments. Given the level of inaccuracy of the original reports (as described above), it might be the case that amended reports are used to rectify the situation. If this were the case, then researchers, investors, and regulators would be justified in relying on these final (amended)

reports, even if the timeliness of such information would still be suboptimal. Of the 15 firms in our original sample, six firms submit amendments to their 13F reports filed in 2012.

In **Table 9**, we provide a summary and comparison of both the original and amended filings for the 4th quarter of 2012.[16] Panel A provides information on the breadth of these amendments by reporting the number of entries (i.e., roughly the number of securities) that appear on the original filing but no longer appear on the amended filing, as well as the number of entries that do not appear on the original filing but do appear on the amended filing.[17] The results show that amended filings often affect thousands of individual securities. Given the relatively high frequency of filing amended reports and the large number of affected securities, it is difficult to have much confidence in any firm's initial filing. We also report changes in the firm's total 13F-reported value of required securities (as recorded at the top of the 13F filing) from the original filing to the amended filing. The results reveal that changes in the billions of dollars are not uncommon.

In Panel B of **Table 9**, we examine the extent of mispricing in the original and amended filings. Similar to our approach in **Table 3**, we present the number of instances in which the market price (i.e., based on CRSP or TRACE) is (1) less than the 13F-reported security price, (2) equal to the 13F-reported security price, or (3) greater than the 13F-reported security price. Although there are cases in which the amended filing appears to be more accurate than the original filing, there are also many cases in which the amended filing appears to be less accurate than the original filing.

Moreover, given the delays in submitting amendments – up to a year after the original filing in our sample – it is not clear how useful such information would be to investors or regulators. For

[16] A similar number of amendments was filed for the other three quarters, and comparisons across these filings are consistent for all four quarters.
[17] An entry consists of a CUSIP number, total market value, and number of shares.

example, HSBC files three amendments to their 4th quarter 2012 13F report. Here is a summary of the differences from one filing to another: (1) 1st amendment (with four month delay) reports approximate increase of 40% in total market value of 13F securities; (2) 41 CUSIPs from original filing do not appear on 1st amendment filing, while 65 CUSIPs reported on 1st amendment filing do not appear on original filing; and (3) changes in ownership range from -100% to 14,554% with 178 instances in which ownership on the amended filing is greater than that reported on the original filing (from the original filing to the 3rd amendment). We find similar results when comparing the amended filings with the original filings for the other banks.

Share ownership inaccuracies. All of our previous results are based on the assumption that discrepancies in 13F-reported total valuations are due to inaccuracies in 13F-reported prices per share. That is, we assume that the firm's 13F-reported number-of-shares figure is perfectly accurate – so any total market value inaccuracy comes from misreported prices per share. However, given the wide discrepancies in 13F-reported prices documented herein, as well as the wide variations in the number-of-shares figures between original and amended filings, there are good reasons to suspect that the number-of-shares figures are also susceptible to reporting inaccuracies. We therefore make the assumption that 13F-reported prices per share are accurate, and then measure the potential impact this has on inaccuracies in number-of-shares figures based on 13F filings from the 4th quarter of 2012.

The (untabulated) results suggest that, to the extent that 13F-reported prices are relatively accurate, percentage ownership figures can be very unreliable. We find, for example, 21 cases in which aggregate ownership by just our 12 reporting firms would exceed 100% of the shares outstanding of the underlying securities. In one extreme case, the 12 reporting firms would have combined ownership of 2,648,923 shares of a firm with only 100,000 shares outstanding.

Switching back to our original assumption of perfectly accurate number-of-shares figures, we then compare ownership percentages based on 13F-reported reported market values to ownership percentages based on actual market prices (i.e, using CRSP/TRACE data). We find differences in these two ownership figures that range from 0.50% to 1.99%. While these changes in ownership appear to be relatively small, it is important to bear in mind that these changes are generated by reporting inaccuracies from just a very small subset (i.e., 12) of all 13F-reporting firms. With hundreds of other firms reporting each quarter, the overall impact on ownership could be quite substantial.

Overall, this section shows that to the extent that 13F-reported prices are accurate, then 13F-reported ownership figures become highly problematic. Although the most likely scenario is that firms misreport both end-of-quarter prices and end-of-quarter shares owned, we expect that the preponderance of errors will occur on the pricing side. But this is mere speculation. What is certain, however, is that without significant changes to SEC oversight of the 13F reporting process, identification of the main sources of error, like many other features of 13F reporting, will continue to be matters of mere speculation.

Proxy statements versus 13F filings. In this final section, we compare institutional holdings' figures of Dow 30 firms based on 13F filings versus the underlying firms' DEF14A filings. DEF14A filings represent the final (or definitive) annual proxy statement that is required of publicly-traded companies (i.e., firms registered under Section 12 of the Securities Exchange Act of 1934). The DEF14A-filing firm must report all entities with beneficial ownership of more than 5% of any class of voting securities as reported on the owning institutions' Schedule 13G. Similar to our selection of the 15 largest bank holding companies (in the previous section), we choose the Dow 30 firms because of their relative sizes and high profiles; that is, our selection

criteria reduce the likelihood that our empirical findings of the frequencies and magnitudes of reporting errors are concentrated primarily among small, low-profile firms. Because Dow 30 firms have multiple shareholders that exceed the 5% reporting threshold, we focus on the two most prolific institutional owners, BlackRock and State Street. For this analysis, we look at beneficial ownership as reported in the DEF14a filed during the first quarter of 2015 and compare this figure to the 13F-reported ownership figure during the same period.[18] For example, the DEF14a-based BlackRock ownership figure for 3M is from the 13G report filed on February 19th of 2015, representing ownership as of December 31, 2014. Similarly, the 13F-based BlackRock ownership figure for 3M is from the 13F report filed on February 9th of 2015, again representing ownership as of December 31, 2014.

In **Table 10**, we present the number of shares of beneficial ownership as reported by the Dow 30 firms (i.e., based on their DEF14A filings) alongside the number of shares as reported by the owning institutions (i.e., based on their 13F filings). In many cases, the differences are staggering. Beginning with the first row of **Table 10**, BlackRock reports on the 13F filing that it owns 1.7 million shares of 3M, while 3M reports that BlackRock owns almost 39 million shares (as reported on Schedule 13G). Similar differences in ownership interests are shown for all 13F-versus-DEF14A filings between BlackRock and the underlying Dow 30 companies, ending with BlackRock's reporting of 12 million shares of Verizon stock versus Verizon's reporting of 259 million shares of beneficial ownership on the part of BlackRock. One of the reasons for these differences is that BlackRock files one 13G but multiple 13Fs for the same holdings. For example, the BlackRock holdings for Pfizer are reported on seven different 13Fs with each 13F reporting the holdings for a different group of funds. However, as noted in **Table 10**, the total number of

[18] With the exception of Apple, ownership figures in the DEF14a filed in the first half of 2015 are for the period ending 12/31/14. Apple filed its DEF14a in early January and reports ownership figures as of 12/31/13.

shares reported on the 13Fs is still 20,000,000 short of that reported on the 13G used by Pfizer to get the Def14A data. This difference may be due to the fact that over the counter options that exercise in 60 days are not reportable on the 13F but are included in the 13G holdings.[19] In contrast, we find few differences between State Street's 13F filings and the Dow 30's DEF14A filings. In most cases the two figures are identical. But even in this relatively accurate example of State Street, we find a significant difference between 13F and DEF14A filings for Boeing. State Street's 13F filing reports 32.6 million shares while Boeing's DEF14A filing reports 78.4 million shares. Overall, these results cast additional doubt on the reliability of 13F filings for the purpose of establishing institutional ownership and the difficulties that arise due to differences in filing requirements.

Conclusion

The role and influence of institutional investors have increased steadily over the past several decades and, perhaps more importantly, show no sign of declining in the future. This capital market development means that it is increasingly important to obtain accurate and timely information about institutional investor holdings and market behavior. The profitability of copycat investor trading strategies, as well as the validity of academic research studies, depends critically on the reliability of institutional investment managers' holdings. As stated in the Executive Summary of the Office of Inspector General's (OIG) 2010 Report, "According to the legislative history for Section 13(f), Congress intended to create in the Securities and Exchange Commission (SEC or the Commission) a centralized repository of historical and current data regarding the

[19] The authors thank Ed Sweeney from BlackRock for providing additional information about the 13F and 13G filings for BlackRock.

activities of institutional investment managers in order to improve the body of publicly available factual data and thereby increase investor confidence in the integrity of the U.S. securities markets." Instead of being a repository of reliable data that serve to "increase investor confidence in the integrity of the U.S. securities markets," our empirical results are consistent with investor complaints that "Form 13F filings are just a non-standardized mishmash of jumbled (and often inaccurate) information." In a nutshell, our evidence shows that reliance on 13F filings for institutional investor holdings is unwarranted, and that investors using 13F-based trading strategies should proceed with extreme caution.

References

Agarwal, Vikas, Vyacheslav Fos, and Wei Jiang. 2013. "Inferring reporting-related biases in hedge fund databases from hedge fund equity holdings." *Management Science*, 59, 1271-1289.

Agarwal, Vikas, Wei Jiang, Yuehua Tang, and Baozhong Yang. 2013. "Uncovering hedge fund skill from the portfolio holdings they hide." *Journal of Finance*, 68, 739-783.

Aragon, George, Michael Hertzel, and Zhen Shi. 2013. "Why do hedge funds avoid disclosure? Evidence from confidential 13F filings." *Journal of Financial and Quantitative Analysis*, 48, 1499-1518.

Blume, Marshall E., and Donald B. Keim. 2012. Institutional investors and stock market liquidity: Trends and Relationships." Working paper, University of Pennsylvania.

Blume, Marshall E., and Donald B. Keim. 2014. "The changing preferences of institutional investors for common stocks." Working paper, University of Pennsylvania.

Brown, Stephen, and Christopher Schwarz. 2013. "Do market participants care about portfolio disclosure? Evidence from hedge funds' 13F filings." Working paper, New York University.

Larrabee, David. "13F Watch: Active Management Looks Like a Contrarian's Bet." Web log post. *Enterprising Investor*. CFA Institute, 17 Nov 2014. Web. 10 Oct 2016.

Melvin, Tim. "What You Can Learn from 13F Filings." N.p., 15 Aug 2016b. www.realmoney.thestreet.com, 10 Oct 2016.

Table 1
SEC 13F filing requirements

This table presents a summary of 13F required securities for each quarter, 2008 – 2012, where SEC# is the total number of Cusips listed on the official list; # duplicate is the number of Cusips that are repeated on the official list; # deleted is the number of securities on the official list that are being deleted from the list of required securities.

year	qtr	SEC #	# duplicate	# deleted	Final # Reqd	ADR/ADR PREF/GDR/GDR PREF	CALL	OTHER*	DEBT	ETF/ETN/FUND	PREFERRED	PUT	SH BEN INT	STOCK	UNIT	WARRANT
2008	1	15532	306	337	14889	420	3398	14	722	647	62	3399	136	5747	200	144
2008	2	15670	314	402	14954	418	3424	13	731	737	66	3425	136	5664	203	137
2008	3	15645	326	385	14934	412	3455	14	671	777	66	3456	135	5602	207	139
2008	4	15621	348	473	14800	411	3468	14	630	796	60	3469	133	5492	199	128
2009	1	15383	384	394	14605	403	3455	14	613	796	58	3456	133	5381	186	110
2009	2	15262	404	393	14465	397	3443	15	629	787	56	3444	132	5285	179	98
2009	3	15216	412	340	14464	389	3482	15	623	809	55	3483	126	5228	168	86
2009	4	15319	420	364	14535	394	3505	16	627	868	55	3506	126	5206	155	77
2010	1	15402	436	402	14564	393	3530	20	624	919	61	3531	130	5142	142	72
2010	2	15487	463	418	14606	393	3564	22	575	928	51	3565	129	5151	144	84
2010	3	15438	464	375	14599	394	3563	21	559	976	52	3564	130	5114	143	83
2010	4	15513	460	381	14672	416	3586	16	558	1020	46	3587	130	5090	141	82
2011	1	15684	493	376	14815	413	3646	17	551	1061	47	3647	133	5076	138	84
2011	2	15889	473	353	15063	419	3724	16	541	1187	52	3725	133	5040	145	81
2011	3	15974	478	349	15147	418	3758	16	524	1243	54	3759	133	5017	145	80
2011	4	16010	490	398	15122	415	3759	17	481	1304	52	3760	133	4977	146	78
2012	1	15965	490	388	15087	394	3744	18	460	1364	52	3745	135	4944	153	78
2012	2	15997	512	316	15169	392	3775	17	451	1391	50	3776	137	4935	161	84
2012	3	16112	518	398	15196	388	3824	18	443	1384	49	3824	132	4886	167	81
2012	4	16137	516	420	15201	386	3855	15	434	1367	48	3854	132	4849	177	84

* Other includes currency shares, CTF, Paired CTF, Rights, Propels, Euro Shares, Gold Shares, and Growth Shares.

Table 2

Summary of 13F filings by top 15 holding companies[20] for the 4th quarter of 2012

An entry consists of a CUSIP, value, and number of shares. Reported value is the value reported at the top of the 13F filing. Value on Report is the sum of the individual values provided within the report. Value with CRSP & TRACE is the value of the holdings replacing the price per share with the price that should have been used – note the 13F requirement is that securities be valued based on the price on the last day of the quarter. For TRACE securities we compare to the price on the last reported trading date for the quarter. OTHER includes preferred stock, warrants, rights and options for which a price comparison could not be made.

Firm	Entries	Not Required	Mislabeled	CRSP	TRACE	OTHER	REPORTED VALUE (000s)	VALUE ON REPORT (000s)	Value with CRSP &TRACE (000s)
JPMORGAN CHASE & CO	24286	670	1456	22931	490	865	288,150,601.62	288,150,637.00	288,150,674.05
BANK OF AMERICA	17462	0	2400	17118	188	156	203,145,758.00	203,145,758.00	203,136,719.56
CITIGROUP INC	19372	0	0	18861	288	223	97,872,562.00	97,865,011.00	97,874,823.37
WELLS FARGO & CO	18050	0	8	17489	376	185	169,526,557.00	169,526,557.00	173,007,774.49
GOLDMAN SACHS GROUP	10085	0	1639	9803	187	95	240,711,494.00	240,711,494.00	240,679,724.53
MORGAN STANLEY	29325	0	4691	28858	311	156	173,011,848.00	173,011,815.00	173,007,776.83
AIG	8423	5	1872	8322	13	88	13,389,028.00	13,387,651.54	13,387,657.37
BANK OF NY MELLON	22350	0	205	22068	190	92	282,895,278.00	282,895,278.00	282,894,662.40
U.S. BANCORP	5175	0	1097	5120	6	49	19,795,038.00	19,794,976.00	19,794,998.05
HSBC Holdings PLC	5455	0	0	5394	1	60	18,659,604.00	18,659,604.00	18,667,303.97
PNC FINANCIAL	8121	0	3	8014	33	74	42,634,874.00	42,609,508.36	42,609,982.82
STATE STREET	3602	6	199	3532	48	22	680,044,351.00	680,044,351.00	679,932,459.18

[20] Three of the top 15 firms did not file 13F reports.

Table 3

Summary of the accuracy of the CRSP-related securities for the 4th quarter of 2013.

For each entry, where available, the price for the last trading day of the 4th quarter was retrieved from CRSP and compared to the value used in the 13F filing. RV is the value implied from the 13F filing and is found by dividing reported value by the number of shares reported. MV is the market price from CRSP and is the closing price on the last trading day of the 4th quarter.

Firm	Entries	Entries with CRSP Prices	MV < RV	MV = RV	MV > RV
JPMORGAN CHASE & CO	22931	22830	7054	8543	7233
BANK OF AMERICA	17118	16985	5499	5870	5616
CITIGROUP INC	18861	18720[B]	7170	3570	7970
WELLS FARGO & CO	17489	17295[c]	5044	6177	5899
GOLDMAN SACHS GROUP	9803	9741	1801	6164	1776
MORGAN STANLEY	28858	28757[d]	9681	8936	9948
AIG	8322	8248	470	7390	388
BANK OF NY MELLON	22068	22002[a]	5433	9590	6248
U.S. BANCORP	5120	5091	1980	1065	2046
HSBC Holdings PLC	5394	5363	704	4010	649
PNC FINANCIAL	8014	7970	158	7670	141
STATE STREET	3532	3521	642	2310	569

a – 731 securities for BoNY had no reported value or shares
b – 10 securities for CITI had no reported value or shares
c – 175 securities for WFC had no reported value or shares
d – 192 securities for MS had no reported value or shares

Table 4

Summary of the accuracy of TRACE-related securities for the 4th quarter of 2012.

For each entry, where available, the price for the last day the bond instrument traded during the quarter was retrieved from TRACE and compared to the value used in the 13F filing. RV is the value implied from the 13F filing and is found by dividing reported value by the number of shares reported. MV is the market value of the security and is the price from TRACE for the last day the debt instrument traded during the 4th quarter.

Firm	Entries	Entries with TRACE Prices	MV < RV	MV = RV	MV > RV
JPMORGAN CHASE & CO	490	481	212	161	108
BANK OF AMERICA	188	183	82	42	59
CITIGROUP INC	288	280	133	78	69
WELLS FARGO & CO	376	367	171	94	102
GOLDMAN SACHS GROUP	187	184	92	59	33
MORGAN STANLEY	311	307	132	105	70
AIG	13	13	8	0	5
BANK OF NY MELLON	190	188	48	117	23
U.S. BANCORP	6	6	2	1	3
HSBC Holdings PLC	1	1	0	1	0
PNC FINANCIAL	33	33	19	0	14
STATE STREET	48	45	23	13	9

Table 5

Summary of price comparisons for all securities in 2012 based on 13F filings.

For each CUSIP reported, we compare the reported price by each firm to determine the range of values used by all firms. In addition we compare the maximum and minimum price reported by each firms to the actual market value (as reported by CRSP) and report the average percent difference and the minimum and maximum percent difference.

	CRSP	TRACE[a]	OTHER
Securities			
Total # CUSIPs	6505	349	605
Total # CUSIPs with multiple observations	6111	306	263
# CUSIPs with Price data for comparison	6333	335	0
# CUSIPS w/o Price data	173	14	605
Average # of Obs per CUSIP			
	25.75	6.11	3.41
Average Range of Prices reported for CUSIPs with Multiple Obs			
For all CUSIPs	16.46	0.079	4.84
For CUSIPs with price data	16.55	0.069	N/A
For CUSIPs without price data	11.56	0.456	4.84
Minimum Price Reported (% difference from CRSP or Trace Price)			
Average	-50.41%	-2.80%	
Minimum Difference	-100%	-100%	
Maximum Difference	92.02%	42.86%	
Maximum Price Reported (% difference from CRSP or Trace Price)			
Average	12.86%	3.12%	
Minimum Difference	-100%	-5.91%	
Maximum Difference	1013.80%	72.41%	

a – TRACE prices based on $1,000,000 bond

Table 6
Price summary for CRSP-related securities (December 2012)

For each firm we compare the number of CRSP-related security CUSIPs reported to the total number of CUSIPs reported by all 12 firms. In addition , for CUSIPS reported by multiple firms, we determine the number of the times each firm's reported value was the minimum or maximum reported value and compare this price to the actual market value (as reported by CRSP).

	AIG	BOA	BONY	CITI	GS	HSBC	JPM	MS	PNC	STATE	USBANC	WFC
# CUSIPS REPORTED BY ALL FIRMS	6505	6505	6505	6505	6505	6505	6505	6505	6505	6505	6505	6505
# CUSIPS REPORTED	4494	5718	3934	5361	3661	1245	3183	5109	3089	3531	3129	5639
# CUSIPS REPORTED BY MULTIPLE FIRMS	6111	6111	6111	6111	6111	6111	6111	6111	6111	6111	6111	6111
# CUSIPS SAME AS THOSE FOR OTHER FIRMS	4468	5619	3929	5269	3645	1245	3178	5096	3087	3525	3119	5519
FOR CUSIPS REPORTED BY MULTIPLE FIRMS WITH PRICE DATA												
# of times Minimum Price Reported	28	717	1421	1784	30	24	610	980	26	16	211	1284
Average % difference Min Price to CRSP	-0.22%	-40.24%	-77.65%	-62.70%	-11.98%	-2.21%	-51.94%	-40.24%	-2.81%	-0.82%	-33.55%	-64.53%
Minimum difference	-2.98%	-100.00%	-100.00%	-100.00%	-100.00%	-28.42%	-100.00%	-100.00%	-69.79%	-3.71%	-100.00%	-100.00%
Maximum difference	0.01%	11.92%	1.30%	25.45%	0.08%	0.00%	0.03%	0.88%	0.34%	1.23%	15.27%	5.18%
# of times Maximum Price Reported	64	984	784	1358	58	14	621	1122	31	41	280	817
Average % difference Max Price to CRSP	1.78%	10.94%	19.93%	18.84%	5.12%	1.22%	20.54%	11.81%	3.26%	27.06%	10.01%	12.03%
Minimum difference	-4.66%	-100.00%	-1.68%	-100.00%	-1.21%	0.00%	-3.70%	-9.09%	-1.32%	-3.25%	-13.42%	-100.00%
Maximum difference	67.93%	99.60%	98.85%	99.71%	69.83%	2.82%	99.98%	105.44%	101.18%	1013.80%	94.93%	99.47%

Table 7
Price summary for TRACE-related securities (December 2012)

For each firm we compare the number of TRACE-related security CUSIPs reported to the total number of CUSIPs reported by all 12 firms. In addition , for CUSIPS reported by multiple firms, we determine the number of the times each firm's reported value was the minimum or maximum reported value and compare this price to the actual market value (as reported by TRACE).

	AIG	BOA	BONY	CITI	GS	HSBC	JPM	MS	PNC	STATE	USBANC	WFC
# CUSIPS REPORTED BY ALL FIRMS	349	349	349	349	349	349	349	349	349	349	349	349
# CUSIPS REPORTED	13	158	108	234	171	1	234	175	26	48	4	219
# CUSIPS REPORTED BY MULTIPLE FIRMS	306	306	306	306	306	306	306	306	306	306	306	306
# CUSIPS SAME AS THOSE FOR OTHER FIRMS FOR CUSIPS REPORTED BY MULTIPLE FIRMS WITH PRICE DATA	13	155	107	227	166	1	219	170	26	46	4	214
# of times Minimum Price Reported	2	44	28	59	32	N/A	53	51	3	6	3	90
Average % difference Min Price to CRSP	0.45%	-4.67%	-4.83%	-4.34%	-0.61%		-1.84%	-1.47%	-1.91%	-0.30%	-4.77%	-5.03%
Minimum difference	0.00%	-100.00%	-100.00%	-100.00%	-20.63%		-34.34%	-25.93%	-3.83%	-1.27%	-13.41%	-30.62%
Maximum difference	0.91%	42.86%	0.10%	4.17%	6.80%		4.11%	51.44%	-0.62%	0.61%	-0.13%	4.77%
# of times Maximum Price Reported	1	36	42	47	38	N/A	44	63	1	5	1	88
Average % difference Max Price to CRSP	0.25%	728.00%	0.62%	3.26%	1.48%		2.06%	1.77%	0.33%	0.98%	60.70%	4.18%
Minimum difference	0.25%	-2.56%	-0.82%	-3.31%	-2.89%		-5.91%	-3.55%	0.33%	0.26%	60.70%	-4.00%
Maximum difference	0.25%	72.41%	8.11%	42.86%	5.51%		24.32%	11.52%	0.33%	1.99%	60.70%	30.89%

Table 8
Price summary for OTHER securities (December 2012)

For each firm we compare the number of OTHER-related security CUSIPs reported to the total number of CUSIPs reported by all 12 firms. In addition, for CUSIPS reported by multiple firms, we determine the number of the times each firm's reported value was the minimum or maximum reported value.

	AIG	BOA	BONY	CITI	GS	HSBC	JPM	MS	PNC	STATE	USBANC	WFC
# CUSIPS REPORTED BY ALL FIRMS	605	605	605	605	605	605	605	605	605	605	605	605
# CUSIPS REPORTED	64	74	24	71	56	15	510	36	39	22	36	90
# CUSIPS REPORTED BY MULTIPLE FIRMS	263	263	263	263	263	263	263	263	263	263	263	263
# CUSIPS SAME AS THOSE FOR OTHER FIRMS FOR CUSIPS REPORTED BY MULTIPLE FIRMS WITH PRICE DATA	42	72	24	66	51	15	218	36	39	21	35	76
# of times Minimum Price Reported	1	18	14	32	1	0	187	9	0	0	9	16
# of times Maximum Price Reported	2	13	5	21	7	1	187	7	2	1	2	23

Table 9
Summary of the amended filings compared to original filing.

Panel A compares market values and information content for the original 13F filed for the 4th quarter of 2012 to the amendments filed. The filing date is provided to show how much time passes between filings and comparison is made between the reported value (recorded at top of 13-F), the value on report (sum total of values reported for each CUSIP), and the value with CRSP/TRACE (value if actual market value is used).

Firm	Filing	Filing Date	Entries	Entities on previous filing not on this filing	Entities on this filing but not on previous filing	REPORTED VALUE (000s)	VALUE ON REPORT (000s)	Value with CRSP/TRACE (000s)
BANK OF AMERICA	Original 12/31/12	2/1/2013	17462	N/A	N/A	203,145,758.00	203,145,758.00	203,136,719.56
BANK OF AMERICA	Amended 12/31/12	4/2/2013	17493	1146	1177	202,266,913.00	202,266,913.00	202,257,879.20
CITIGROUP	Original 12/31/12	2/14/2013	19372	N/A	N/A	97,872,562.00	97,865,011.00	97,874,823.37
CITIGROUP	Amended 12/31/12	4/9/2013	18902	2169	1699	95,203,688.00	95,196,269.00	95,205,735.15
Goldman Sachs	Original 12/31/12	2/14/2013	10085	N/A	N/A	240,711,494.00	240,711,494.00	240,679,724.53
Goldman Sachs	Amended 12/31/12	6/14/2013	10085	6	6	240,738,468.00	240,738,468.00	240,706,699.66
Morgan Stanley	Original 12/31/12	2/14/2013	29325	N/A	N/A	173,011,848.00	173,011,815.00	173,007,776.83
Morgan Stanley	Amended 12/31/12	2/21/2013	29324	2	1	172,742,351.00	172,742,285.00	172,738,246.78
HSBC	Original 12/31/12	2/14/2013	5455	N/A	N/A	18,659,604.00	18,659,604.00	18,667,303.97
HSBC	Amended 12/31/12	6/17/2013	5574	5324	5443	25,971,056.00	25,971,056.00	25,797,296.01
HSBC	Amended 12/31/12	10/10/2013	5134	706	266	25,749,645.00	25,749,645.00	25,575,771.05
HSBC	Amended 12/31/12	12/23/2013	5134	N/A	89	N/A	25,845,790.00	25,718,549.18

Table 9 - Continued

Panel B examines the accuracy of the original and amended reports. For each entry, where available, the price for the last day the security traded during the quarter was retrieved from CRSP or TRACE and compared to the value used in the 13F filing. RV is the value implied from the 13F filing and is found by dividing reported value by the number of shares reported. MV is the market value of the security and is the price from CRSP or TRACE for the last day the debt instrument traded during the 4th quarter.

Firm	Filing	Filing Date	Entries	Entries with CRSP/TRACE Price	MV < RV	MV = RV	MV > RV	No Value Reported
BANK OF AMERICA	Original 12/31/12	2/1/2013	17462	17168	5581	5912	5675	0
BANK OF AMERICA	Amended 12/31/12	4/2/2013	17493	17199	5567	5989	5643	0
CITIGROUP	Original 12/31/12	2/14/2013	19372	19001	7302	3646	8043	10
CITIGROUP	Amended 12/31/12	4/9/2013	18902	18553	7085	3585	7873	10
Goldman Sachs	Original 12/31/12	2/14/2013	10085	9925	1893	6222	1810	0
Goldman Sachs	Amended 12/31/12	6/14/2013	10085	9925	1892	6223	1810	0
Morgan Stanley	Original 12/31/12	2/14/2013	29325	29064	9814	9041	10017	192
Morgan Stanley	Amended 12/31/12	2/21/2013	29324	29063	9814	9040	10017	192
HSBC	Original 12/31/12	2/14/2013	5455	5364	704	4011	649	0
HSBC	Amended 12/31/12	6/17/2013	5574	5445	1943	1525	1977	0
HSBC	Amended 12/31/12	10/10/2013	5134	5006	1775	1473	1758	0
HSBC	Amended 12/31/12	12/23/2013	5134	5095	1820	1464	1811	0

Table 10
DOW30 Beneficial Ownership: BlackRock and State Street Comparison

For each DOW30 firm we compare the number of shares reported on the DEF14a for 5% beneficial owners to the ownership reported on the 13F by the owning institution for the 4th quarter of 2014. Specifically, the figures from the DEF14a are compared to the 13F that is filed on or just before the same date as the 13G (used to determine ownership for DEF14a).[21]

FIRM	5% Holder	Shares from DEF14a	Shares Reported on 13F by Firm	Shares Reported on 13Fs filed by firm and Affiliates
3M	State Street	49,753,937	49,753,937	49,753,937
	BlackRock	38,979,264	1,700,178	**38,979,692**
American Express	BlackRock	55,471,621	2,172,012	**55,503,027**
Apple	BlackRock	315,862,269	15,236,776	**315,932,661**
Boeing	State Street	79,401,688	32,577,285	**32,577,285**
	BlackRock	36,376,992	1,755,509	36,379,929
Caterpillar	State Street	59,086,900	59,086,900	59,086,900
	BlackRock	30,284,244	1,450,156	30,284,244
Chevron	State Street	108,772,974	108,772,974	108,772,974
	BlackRock	118,754,384	5,335,652	118,754,384
Coca Cola	BlackRock	236,175,490	10,826,628	**225,923,244**
Exxon Mobil	BlackRock	239,360,713	11,910,700	**239,360,527**
General Electric	BlackRock	569,952,359	24,569,261	**569,951,825**
Goldman Sachs	State Street	24,198,695	24,198,695	24,198,695
	BlackRock	25,071,873	1,037,903	**24,321,714**
Home Depot	BlackRock	83,613,413	3,678,610	**83.611,963**
IBM	State Street	54,654,233	54,654,238	54,654,238
	BlackRock	53,231,078	2,282,649	**51,231,078**
Intel	BlackRock	291,682,994	11,897,739	**291,681,904**
JNJ	State Street	159,065,904	159,065,904	159,065,904
	BlackRock	171,475,096	8,740,129	**161,475,096**
JPMorgan Chase	BlackRock	245,571,776	10,332,344	**240,570,829**
McDonalds	State Street	49,425,256	49,425,256	49,425,256
	BlackRock	67,173,115	3,168,689	67,173,115
Merck	BlackRock	188,561,141	8,315,602	**188,560,014**
Pfizer	BlackRock	445,830,318	19,725,430	**425,829,228**
Travelers Cos	State Street	20,620,887	20,620,887	20,620,887
	BlackRock	27,006,945	1,175,856	**27,006,682**
United Technologies	State Street	105,379,932	105,379,932	105,379,932
	BlackRock	51,933,863	2,174,553	**51,340,281**
Verizon	BlackRock	259,197,591	12,103,943	**257,669,329**

[21] For example, the DEF14a BlackRock ownership figures for 3M are from a 13G filed on 2/9/15, representing ownership as of 12/31/14. The 13F figures are also from the reporting period 12/31/14, which was filed on 2/9/15.

Appendix

US Bancorp – from 13F filed 2/13/13 for the 12/31/12 period

OBS	Name of Issuer	Title of Class	CUSIP Number	Fair Market Value (x1000)	Shares or Principal Amount
1	VISTEON CORP	COM	92839U206	1	10
2	VISTEON CORP	COM	92839U206	22	400
3	USANA HEALTH SCIENCES INC	COM	90328M107	2	53
4	TUMI HOLDINGS INC	COM	89969Q104	2	75

From CRSP

Name of Issuer	Closing Price 12/31/12	Shares Outstanding 12/31/12
VISTEON	53.82	52802000
USANA HEALTH SCIENCES	32.93	14426000
TUMI HOLDINGS INC	20.85	67867000

From the 13F data, if we assume the shares are reported correctly, the value per share can be found by taking the FMV*1000 and dividing by shares outstanding. **Note – in this section, we assume that the # of shares reported is correct.** The results of this are shown in the table below:

OBS	Name of Issuer	Price Per Share	CRSP Price	CRSP Price – Reported Value
1	VISTEON CORP	100	53.82	-46.18
2	VISTEON CORP	55	53.82	-1.18
3	USANA HEALTH SCIENCES INC	37.73585	32.930	-4.81
4	TUMI HOLDINGS INC	26.6667	20.85	-5.82

An alternative option is that firms are using the correct value but are incorrectly reporting ownership. If we assume the correct value is used, we can find what the ownership would be by taking the FMV*1000 and dividing by the closing price per share. The table below shows the shares as reported in the 13F (and %) and the shares corrected given the closing price noted above:

OBS	Name of Issuer	Shares from 13F	% Ownership	Shares corrected using closing price	% Ownership	Percent change in # of shares*
1	VISTEON CORP	10	0.0000%	18.58045	0.0000%	85.80%
2	VISTEON CORP	400	0.0008%	408.77	0.0008%	2.19%
3	USANA HEALTH SCIENCES INC	53	0.0004%	60.73489	0.0004%	14.5941%
4	TUMI HOLDINGS INC	75	0.0001%	95.92	0.0001%	27.893%

* Percent change = (corrected shares – reported shares)/reported shares